

CFT/CPS Axial Daughterboard Assembly Fabrication Specifications

3 March 2000

General Information

The CFT/CPS AXIAL Daughterboard (CFT_DB) is a 7.800" x 4.125" printed circuit board with approximately 220 components, 17 unique. Most of the components are surface mount, the smallest are "0603" discrete passives. There are a total of five BGA devices on the board: each BGA is a 31x31 periphery array consisting of 432 balls on 1.27mm centers. *It is expected that the vendor will supply all components for this assembly.*

1. The vendor shall fabricate and test a total of **ten (10)** printed circuit boards that meet the specifications outlined in the file *pcb_fab_spec.pdf*.
2. A total of eight (8) boards will be assembled and tested in accordance to the specifications outlined in this document.
3. The eight (8) stuffed boards as well as two (2) bare boards shall be sent to Fermilab **in anti-static bags** for approval.
4. **Upon Fermilab approval an additional one hundred fifty (150) boards shall be fabricated and tested per the specifications outlined in the file *pcb_fab_spec.doc*.**
5. **Eighty (80) fully assembled, inspected, and tested boards and seventy (70) bare boards shall be sent to Fermilab in anti-static bags.**

Substitution of Equivalent Components

It is expected that the vendor will purchase all components. Substitution of equivalent components must be approved in writing by Fermilab.

At the time of writing all components are in stock at major distributors (Digi-key, Avnet, etc.) or have lead times of less than two weeks. An estimated cost for each component is specified in the spreadsheet *bom.pdf*.

Any component with a lead time longer than 2 weeks must be identified in the vendor quotation.

Component Additions, Deletions, and Substitutions Initiated by Fermilab

Additions, deletions, and substitutions to the parts list can occur for each assembly phase and will be handled as follows:

- Price differentials for the remaining assembly will be submitted by the vendor to Fermilab in writing.

- If the resulting differential results in a price increase, Fermilab reserves the right to purchase the part and supply it to the vendor for assembly with a corresponding downward adjustment in the contact price via a change order.
- Deleted parts that cannot be returned to the distributor and/or OEM will be delivered to the Fermilab without adjustment of the contract price.
- Restocking charges encountered by the vendor on deleted parts will be added to the contract price via a change order.

Board Assembly Drawings

Assembly drawings are provided in Gerber format. The “component side” drawing is *ast.gbr* and the “solder side” assembly drawing is *asb.gbr*. These drawings are also available in *assembly.pdf*.

If the vendor requires other data formats for use in automated “pick and place” machines the files will be provided by Fermilab upon request.

Component Rework

BGA components damaged in the assembly process must be replaced or reworked at the vendor’s expense. Use of reworked or “re-balled” BGA components is subject to Fermilab approval in writing.

Protection of Gold Plating on “Solder” Side of PCB

As per the specification *pcb_fab_spec.pdf* there are selective 1.25 μm “hard” gold areas on the “solder” side of the board. These areas must be kept clean and free from solder and/or flux.

Final Inspection and testing

Initially eight (8) boards will be stuffed and sent to Fermilab for checkout. The BGA components on these eight (8) boards must be inspected by the vendor *with x-ray imaging equipment* for defects prior to shipment to Fermilab for checkout. Labeled x-ray films or image files on disk must be supplied to Fermilab.

Fermilab shall receive eight (8) fully stuffed boards and two (2) bare boards for inspection and in-house testing. Fermilab reserves the right to cancel the contract if these ten (10) boards are unsatisfactory. Upon written Fermilab approval of these boards the vendor can begin production of the remaining ~~eighty (80)~~ **one hundred fifty (150) bare boards, eighty (80) of which will be fully assembled**. Each of these boards must be tested as follows:

Each of the remaining eighty (80) assembled boards must be x-rayed and visually inspected to insure correct solder reflow under the BGA components. Labeled x-ray films (or image files on disk) of each BGA must be supplied to Fermilab. **Additionally, resistance between the +3.3V, +2.5V and GROUND planes must be checked with a DMM as specified in the document *assembly_test.pdf*.**

Schedule

Eight (8) fully assembled boards and two (2) bare boards will be delivered to Fermilab within four (4) weeks of accepting the bid. Based on the quality of these samples Fermilab will approve production of the remaining **one hundred fifty (150)** bare boards, **eighty (80) of which shall be fully assembled and tested.**

The shipment of ~~fifty (50)~~ **seventy (70)** bare boards meeting the specifications outlined in *pcb_fab_spec.doc* is due within three (3) weeks of Fermilab approval.

The shipment of eighty (80) fully assembled, **inspected, and** tested boards is due within five (5) weeks of Fermilab approval.